Night Vision for Special Warfare

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The goal of this project is to develop a field-worthy, operationally relevant, night-vision test that (a) has known, definable relations to tests in the optometric literature and (b) is predictive of operational performance in a variety of nighttime conditions.

We are correlating performance on a targeting and marksmanship task (the operational task) with standard measures of visual acuity under selected nighttime lighting conditions (the laboratory tests). Measurements are being obtained in the presence and absence of a moderately intense light flash, similar to the muzzle flash of a gun. In the case of the flash test, the dependent variable is the time required for visual acuity to return to a criterion level. With this information, a field-worthy vision test battery will be constructed, and its correlation with the field marksmanship of operational personnel will be evaluated.

This study produced three significant discoveries during the past year. First, differences in visual acuity between individuals from twilight through overcast starlight are sufficient to cause significant individual differences in marksmanship. Second, individual differences in spatial visual acuity in reduced illumination predict the individual differences in marksmanship in conditions of reduced illumination. Third, individual differences in flash recovery are sufficient to cause significant differences in marksmanship. Instrumentation for flash recovery, parameterization, and control studies was designed and implemented. A muzzle-flash simulation was developed to study muzzle-flash effects on nighttime marksmanship. This instrumentation required the development of a new technique to score performance. The technique used specialized computer hardware (Optimouse, by Eye Scan Inc.) to obtain x-y coordinates of the bullet hole, and software written by our staff to keep all the data consistent and comparable with Beamhit data.

Demographic data collection was begun and is continuing at the Naval Training Center Great Lakes; 80 subjects have been collected to date. This study intentionally covers a wide demographic age range in both genders. The NAMRL 'NITE' Mobile Field Laboratory was deployed to Norfolk, Virginia, in conjunction with the Naval Weapons Center, Crane, Indiana, to train Navy SEALs in night vision issues and collect demographic data for this study.